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PROGRESS REPORT ON FIRE-STUDY TREES

SUGAR HILL FIRE

MODOC NATIONAL FOREST, CALIFORNIA

by

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Berkeley, California
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One of the problems resulting from the Sugar Hill fire of July, 1929, concerned the selection of fire-injured but living trees for cutting on the less severely burned areas. Over much of the area covered by the fire a 100 per cent kill of the stand resulted. On some areas, however, the fire was less severe, and many of the trees gave promise of recovery. On these areas it was desirable to know, as definitely as possible, what trees had the best chance of surviving both the fire injury and subsequent insect attack.

A study of 155 fire-injured trees was started in September 1929, to determine whether the results of the studies by Miller and Patterson were applicable in the Modoc area. Only trees in Fire Injury Classes II to V were included in the study. A preliminary report was made in May 1930. The tables giving the distribution of the trees by fire-injury classes and the amount of cambium injury and insect infestation are repeated here:

TABLE I
Condition of Sample Trees

Injury Class	Volume	Tot. Trees	Number of Trees		Volume bd.ft.	
			W.Cr.Pl.	L.Cr.Pl.	W.Cr.Pl.	L.Cr.Plot
II	32,080	35	15	20	11,920	20,160
III	37,330	44	28	16	24,730	12,600
IV	20,130	32	20	11	16,130	4,000
V	26,060	44	36	8	24,880	1,230
Total	115,590	155	100	55	77,610	37,980

TABLE II
Lassen Creek Plot

Injury Class	Cambium Killed		Flatheads		Cerambycids
	No. of Trees	Per Cent	No. Trees	Per Cent	No. of Trees
II	9	45	0	0	0
III	11	69	0	0	0
IV	9	82	1		0
V	6	75	1		0
Total	35	Av. 64	Tot. 2	3.6	

TABLE III

Willow Creek Plot

Injury Class	Cambium Killed		Flatheads		Cerambycids
	No. of Trees	Per Cent	No. Trees	Per Cent	No. of Trees
II	6	40	0	0	0
III	12	43	8	29	0
IV	9	43	4	19	1
V	30	56	12	33	3
	Tot. 47	Av. 47	Tot. 24	Av. 24	Tot. 4 4%

1930 Examinations

Two field examinations were made in 1930, one in May and the other in early September. All trees were carefully examined and notes were taken on the tree condition.

By September 1930 twelve of the 155 experimental trees had died, ten on the Willow Creek and two on the Lassen Creek Plot. The principal data on the dead trees are presented in the following table:

TABLE IV

Data on Experimental Trees Which Died Following the Fire

Tree No.	Date of Death	Cause	Fire Injury Class	% Crown Injury	Area of Fire-Killed Cambium
		Willow Creek Fire Plot			
7	9/15/30	D.b.	IV	60	S side up 15' around old fissure
8	"	"	V	85	None at base; apparently some around lower limbs
15	"	*F.H.& R.H.	V	98	0-15' on S ; to 2/3
17	"	D.b.	V	85	0-10' on S side
18	"	R.H.& F.H.	V	100	0-10'
19	"	D.b.	V	100	0-20' on S side
23	"	F.H.	V	50	S up to 8'
33	"	D.b.& F.H.	V	90	None
34	"	F.H.& R.H.	V-VI	85	0-10' all around except narrow strip on S side; old fissure on N side
97		D.b.	III	40	SE side 0-1', extending old fissure
		Lassen Creek			
136	"	F.H.primarily; some RH	V	90	0-6' except 6" strip on S side
154	"	Windfall; Db and FH came in later	II	10	None

*F.H.--flatheaded wood borers (buprestids), principally Melanophila spp.
R.H.--roundheaded " (cerambycids)

Although the study has not run long enough to be very conclusive as to results, a few interesting points may be noted.

Six of the 18 trees which have died since the fire were attacked by D.brevicomis, five were infested only with buprestids and cerambycids, and one was a windfall. In all cases where the tree is infested only with woodborers it is assumed that fire is the principal cause of the tree's death, since there are no primary insects present. The deaths of most of the trees of this group could have been predicted on the basis of the first examination, since all the trees that died without being attacked by the western pine beetle had either a nearly complete defoliation or severe cambium injury or both; see Trees 15,19,23,34 and 136 in Table IV.

On the other hand, some of the trees attacked by D.brevicomis would probably have survived but for that attack. Two of these trees, 7 and 97, were in Fire Injury Classes IV and III respectively, with only 40 to 60 per cent defoliation and no cambium injury except the extension of old fire scars. Both of these trees would almost certainly have recovered from the fire injury. Three of the other trees infested with D.brevicomis --8, 17 and 33--had 85 to 90 per cent defoliation and very little apparent cambium injury except for the extension of fire scars, so that they would have had a fair chance of recovery from the fire injury. The other D.brevicomis-attacked tree, No. 19, would very probably have died from the fire injury even though not attacked by D.brevicomis.

By fire injury classes, nine of the 44 trees in Class V, or 20 per cent, have succumbed within little more than a year after the fire. Only one tree in each of the other fire injury classes has died, the Class II tree being a windfall.

All the dead trees died during the summer of 1930. A few of the trees infested only with buprestids were apparently almost dead in May 1930, but most of the D.brevicomis-infested trees had healthy-looking foliage when the spring examination was made, and showed considerable recovery from the effects of the fire.

It is interesting to note that all the D.brevicomis-killed trees were on the Willow Creek plot. The only evident reason for this difference in the two plots in number of D.brevicomis-infested trees is that the Willow Creek plot is located on the northern edge of the burned area, near infestation in the Buck Creek Unit. Possibly the infestation from the surrounding timber has just started to work into the burned area, and the Lassen Creek plot has suffered little from D.brevicomis because it is near the center of the burn and so a considerable distance from outside infestation.

Recommendations

It is suggested that the examinations be continued for at least three or four years, or until all the experimental trees have either succumbed or fully recovered from the effects of the fire. Another set of increment cores should be taken from all the sample trees within the next year or two, to determine the effect of the fire on growth rate and also the stage of recovery of the trees.